

What is Claimed is:

1. A machine for generating usable energy from a wind source, comprising:

a casing structure; and

a rotor having a blade structure, wherein the rotor is positioned within the casing structure, wherein the rotor has a substantially vertical axis of rotation, and wherein the casing structure defines an air inlet upstream of the rotor that is oriented with respect to a prevailing wind direction and an air outlet downstream of the rotor, and wherein the casing structure has:

a main passage, wherein air flows through the main passage and interacts with the blade structure; and

first and second side passages, wherein the first and second side passages are delimited by first and second sidewalls of the casing structure, respectively, and wherein the first and second side passages converge toward one another near the air outlet forming a zone of low pressure downstream of the rotor.

2. The machine of claim 1, wherein the casing structure has an outer surface that is substantially cylindrical.

3. The machine of claim 1, wherein the blade structure comprises a plurality of blades spaced circumferentially apart around the axis of rotation of the rotor.

4. The machine of claim 1, further comprising:

lower and upper cover plates, wherein the lower and upper cover plates vertically delimit the main passage and the first and second side passages.

5. The machine of claim 1, further comprising:

lower and upper cover plates, wherein the lower and upper cover plates are substantially perpendicular to the axis of rotation of the rotor, and wherein the lower and upper cover plates vertically delimit the main passage and the first and second side passages.

6. The machine of claim 1, further comprising:

a plurality of baffles, wherein the plurality of baffles are mounted within the casing structure upstream of the rotor, and wherein each baffle of the plurality of baffles has a substantially vertical axis of rotation.

7. The machine of claim 1, further comprising:

a plurality of panels, wherein the plurality of panels are mounted within the casing structure upstream of the rotor, and wherein the plurality of panels are spaced apart from one another and partially surround a portion of the rotor.

8. The machine of claim 1, further comprising:

first and second side passage structures, wherein the first and second side passage structures partially surround a portion of the rotor, and wherein the first and second side passages are

further delimited by the first and second side passage structures, respectively.

9. The machine of claim 1, further comprising:

an air inlet protection grid, wherein the air inlet protection grid is mounted across the air inlet.

10. The machine of claim 1, further comprising:

an air outlet protection grid, wherein the air outlet protection grid is mounted across the air outlet.

11. The machine of claim 1, further comprising:

means for rotating the casing structure about a vertical axis of the casing structure to orient the air inlet with respect to the prevailing wind direction.

12. The machine of claim 1, further comprising:

means for rotating the casing structure about a vertical axis of the casing structure to orient the air inlet with respect to the prevailing wind direction, the means for rotating comprising:

a ground rail; and

a plurality of wheels, wherein the wheels are mounted on the casing structure and engage the ground rail to rotate the casing structure about the vertical axis of the casing structure.

13. The machine of claim 1, further comprising:

a wind direction sensor, wherein the wind direction sensor senses the prevailing wind direction.